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ABSTRACT

This guide is intended to assist local planners in developing a policy for awarding equivalent credit for materials taught in vocational and regular academic classrooms. The first section summarizes the benefits of developing an equivalent credit policy. The second section provides details on developing an equivalent credit plan. It lists the benefits of an equivalent credit policy to students, teachers, and taxpayers and presents guidelines for the following eight steps in initiating the planning process: reviewing state and local guidelines, determining which curriculum areas offer the most promise, establishing a support group to guide the planning effort, building communication and trust among faculty, matching student learning outcomes for comparison, determining credit possibilities and transcript designations, keeping everyone informed, and monitoring the process. The third section covers some of the questions that people are likely to ask in conjunction with the establishment of an equivalent credit policy; issues these questions raise include teacher certification, the reaction of colleges and universities to equivalent credit policies, assessment and testing, staff development, scheduling problems, and additional space and materials requirements. The final section discusses various types of resources available to assist in planning. Appendixes include a discussion of the background of the guide, a partial survey of Washington district practices, materials on approaches used by models from selected school districts, and a list of participants in area workshops on the academic-vocational connection. (MN)

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Options for Equivalent Credit in the High School Curriculum

A GUIDE FOR LOCAL DECISION MAKING

Research Project
Yakima Valley Vocational Skills Center
Northwest Regional Educational Laboratory

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
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April 1986

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Booth Gardner, Governor
Isiah Turner, Employment Security Department Commissioner
Merritt D. Long, CVE Executive Director

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"[The] philosophy that I hope will guide vocational education)...would mean a solid academic curriculum for all students. But that curriculum would vary in approach for different students. Those whose career plans do not require a baccalaureate degree, for example, might spend less time on the periodic table of elements and more on scientific reasoning, less on allegories and more on the logic that underlies a training manual.

There is certainly nothing wrong with putting learning in the context of work. Some students learn better that way. I did. The context for learning must be different for different students--again, this is our way of respecting diversity."

--William J. Bennett
U.S. Secretary of Education
December 6, 1985
Atlanta, Georgia

"...Whether a particular course may satisfy more than one subject area requirement for different students shall be determined locally in accordance with rules adopted by boards of directors of districts."

--WAC 180-51-025
Washington State Board of Education
August 1985

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The success of this project is the result of participation by dozens of persons from all parts of the state. Special recognition should be given to Bob McLoughlin, former director of the Yakima Valley Area Vocational Skill Center, now principal of Davis High School in Yakima, and Bill Mohler, former executive director of the Commission for Vocational Education, now director of the Bates Vocational-Technical Institute in Tacoma, for having the vision to initiate the project and secure the necessary funding. Gary Dietzen, director of the Yakima Valley Area Vocational Skill Center, served as project director and handled behind-the-scenes paperwork and made important field contacts. Under Gary's guidance, a small group comprised of Al Burmester, North Thurston; Richard Manion, Tacoma; and Bruce Hawkins, Kennewick, reviewed an early draft of these guidelines and made valuable suggestions for improvement.

In January, February and early April the guidelines were pilot-tested with teams from selected school districts invited to one-day workshops to assess how well the process would work in their community. Sites for the review sessions were Bellevue, Pasco and Vancouver. Districts were encouraged to bring the vocational education administrator, the district's curriculum director, a high school principal, a vocational teacher, an academic teacher or department chair, a counselor, and a school board or vocational advisory committee member. Participation in the sessions was excellent and evaluations were positive. Again, a number of constructive changes were made based on this feedback.

Districts attending the workshops and reviewing the initial guidelines included Battleground, Bellevue, Camas, Castle Rock, Deer Park, Eastmont, Edmonds, Educational Service District 112, Grandview, Issaquah, Kelso, LaCenter, Lake Washington, Longview, Ocean Beach, Richland, Ridgefield, Snoqualmie, Vancouver, Wahkiakum, Wenatchee, West Valley, and Yakima.

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I. INTRODUCTION

This guide is for anyone who believes that excellence in secondary education can be achieved by:

- helping students see the connections between what they learn in school and everyday applications, demonstrating how school subjects contribute to future employability, and making more informed choices of secondary course offerings that will match long-term career areas of interest;
- making more effective use of valuable classroom and laboratory time;
- encouraging teachers to show how coursework in one field relates to the content in another area of study;
- taking advantage of diverse student learning styles, recognizing that many students learn better if they can apply theoretical concepts using an experiential framework;
- capitalizing on diverse teaching styles, recognizing that a common core of skills can be taught in a variety of ways;
- providing diversity in the areas that students <u>can</u> explore, recognizing that they will make three to five career changes in their lifetimes.

The viewpoint stated in this guidebook is that the time has come for secondary schools in Washington State to recognize the historic connections between vocational education and academic skills. Therefore, curriculum leaders and teachers should join forces with concerned community representatives and aggressively and deliberately develop interdisciplinary approaches to the high school curriculum.

Why this concern now? Some will say it is because vocational educators and others in the elective areas of the school program are concerned about declining enrollments. This is certainly one reason for alarm. But the overarching motivation must be more than program survival.

The reason many Washington educators and employers are addressing these issues today is because they see an opportunity to open up more horizons for young people--many of whom express frustration over crowded school schedules, irrelevant curriculum, duplicate coursework, lack of support for experiential learning and inadequate preparation for post-secondary education/training and employment.

<u>Equivalent credit</u> is the focus of this pamphlet though other approaches to the academic-vocational "connection" are provided in Appendix A. We define equivalent credit as the result of an informed decision made by a student, teacher, counselor, principal and school board that learning outcomes in one content area or course can be mastered in optional ways. Guidelines presented are based on a nationwide and statewide survey of current curriculum policies and practices at the state and local levels.

II. HOW TO DEVELOP AN EQUIVALENT CREDIT PLAN

Define the Issues

Before launching a full-scale planning effort on equivalent credit, it may be wise to step back and consider the bigger picture. You are about to enter a creative and challenging process that strikes to the core of what teaching and learning are all about in today's secondary education system. The issues you uncover and procedures that are set in place could inititate many positive changes. Similarly, the pitfalls which you will encounter can be bridged more easily if everyone understands the benefits which can be achieved.

Begin by listing the impacts on various groups if an equivalent credit policy were established in your school system. The following list shows how educators in several Washington school districts assessed the "environmental impact" of implementing such a process:

Benefits to students

1. Allows more choices for students
2. Provides opportunities for students to explore options
3. Meets individual needs and specific interests of students
4. Allows students to "buy in" to classes that are in their best interests
5. Allows students to succeed
6. Recognizes differences in student learning styles
7. Enables students to relate curriculum to real-life needs

Benefits to teachers

1. Allows teachers to keep on working in their specialty fields
2. Creates better understanding of entire curriculum by individual staff members
3. Keeps elective program intact
4. Keeps teachers on target
5. Helps staff see there is more than one way to meet the same objective
6. Helps meet the needs of a larger segment of student body
7. Reinforces content in other courses
8. Relieves class size burdens in some courses
9. Eliminates unnecessary overlap and content duplication
10. Encourages teachers to work together across subject areas
11. Reduces a "second class" image for some courses/programs

Benefits to taxpayers

1. Keeps teachers working in their major fields
2. Produces better-prepared students who can demonstrate a balance of theory and practice
3. Builds confidence that schools are trying to be cost-effective
4. Helps community see a vision of the future where the integration of knowledge from a number of fields is essential

As your district begins to discuss the possibilities of equivalent credit, a number of concerns will be identified. Some of the issues to be faced include:

1. How do we find a common ground for starting?
2. How do we make sure accountability is built into the system--that what we say is being taught in a particular course is actually being taught?
3. How do we make sure neither academic nor vocational coursework is trivialized or watered down by the process? Equivalent credit must never be viewed as an easy way out for students!
4. How are we going to deal with the very real turf and self-protection motives that are part of any change process?

Initiate Planning

Based on reports from agencies that are successfully implementing curriculum alignment efforts, which result in awarding equivalent credit, we suggest the following steps:

1. Review state and local guidelines.

The Washington school code specifically allows local school boards to determine equivalent credit policies:

> ...whether a particular course may satisfy more than one subject area requirement for different students shall be decided locally in accordance with rules adopted by boards of directors or districts. WAC 180-51-025

Appendix C includes procedures from selected Washington districts which do offer equivalent credit.

The most important decision you need to make at this point is how visible you want the equivalent credit process to become. Our conversations with district teams in Washington state reinforced two philosophical approaches: (1) decide to ask the school board for a comprehensive districtwide policy that might specify approvals and sign-offs by various administrative and curriculum committees with eventual board review and adoption of the actual equivalency requests, and (2) a more informal approach that simply asks for the school board to approve a process involving teacher and administrative decision making, primarily at the building level, perhaps with an annual report to the board on how many students are awarded equivalent credit each year.

The advantages and disadvantages of each approach are obvious: on the positive side, you probably want to secure as much ownership as possible in the process--which means involvement and communication with all the key actors; on the negative side, "going public" also invites endless criticism from persons who sincerely believe there is only one way to teach geometry or compose a paragraph.

Your district might choose an approach that is both formal and informal. Each community has its own traditions, its own unique mix of personnel, its own expectations for schools. The fact that the state of Washington has allowed local boards to make the determination encourages creative local solutions.

2. Determine which curriculum areas seem to offer the most promise.

Let's assume that a building principal is taking the leadership in advocating equivalent credit for your district with the vocational director providing some behind-the-scenes support. If it is not the principal at the helm now, he or she will have to be later on if the process is to evolve into long-term policy and practice.

Most districts start by looking inside a high school building for program areas where one or more of the following criteria are in place: (a) a faculty member is interested in program improvement, (b) a faculty member recognizes interdisciplinary possibilities, (c) a faculty member has broad experience and/or credentials and may have more than one preparation already, (d) a faculty member gets along with other teachers and is not afraid to ask colleagues for help.

Naturally there are some logical places to start. In October 1985, for example, 49 districts allowed science credit to be earned in agriculture programs, 48 offered English equivalency in business education, and 40 offered math credit in business courses. Appendix B provides an overview of other patterns as well.

A districtwide approach, setting out equivalencies that will apply in more than one building, may be necessary in large districts but can result in hard feelings if local buildings do not have a sense of ownership. What works well in one school may not hold true in another.

3. Establish a support group to guide your effort.

Districts with an established procedure may already have a curriculum committee designated to approve equivalent credit requests. Chances are this will be comprised of teachers representing both required and elective courses, a curriculum specialist, an administrator, etc. We shall assume in this case that the district has no procedure in place and that you will need a support group that will oversee the process and serve as a sounding board as well as advocacy group.

Members of this committee should include both vocational and academic faculty representing the areas in question, one or more "neutral" teachers who do not represent the content fields to be equated, a curriculum specialist if there is one in the district and the high school principal from the buildings where credit equivalency is being sought. We also strongly recommend another important category--one or more employers from the local community.

The importance of business input cannot be overstated. These persons become powerful "neutralizing agents" should there be a debate about where and how certain content should be delivered. More importantly, employers can help identify the specific outcomes they seek from the

skill areas in question. As will be noted later, they also are effective spokespersons when it comes to making presentations to faculty, administrators and the board of directors. Others to consider adding to the committee might be two- or four-year college representatives, particularly if your district might be considering some articulation possibilities. Yet another person to consider would be a representative from the local Private Industry Council since these JTPA policymakers also are responsible for youth employability competencies (which include educational skills).

4. Build communication and trust among faculty.

The heart of the curriculum alignment process lies in the kinds of feelings people will experience at the building level. Experience tends to show that an established district policy, an administrative mandate, examples from nearby districts, pressure from parents or other "outside" influences will not ipso facto make curriculum alignment work. Successful equivalent credit efforts hinge on teachers willing to spend the time it will take to build communication and trust. Here are the ways to begin building that positive climate:

(a) Exchange course outlines

A simple first step is to trade course goals and student learning outcomes (SLOs). These can be backed up by exchanging textbooks and supplementary materials. This kind of "getting acquainted" activity in one school resulted in joint use of expensive hydraulic simulation equipment in an auto shop by the science department.

(b) Classroom visitations

This activity can either be schoolwide or confined to the two or more curriculum areas in question. A good way to begin is to conduct regular department tours during the year as regular faculty meetings. One department might be visited each time by all other teachers in the building. Students and teachers in the host department explain program content, demonstrate relevant activities, show student projects, describe prerequisites, etc. Not only is this a technique to build interdepartmental understanding but it helps faculty as they advise students on potential course offerings.

If the preferred approach is teacher teams, then time should be set aside for faculty members to observe each other's classes (or cover each other's classes) to gain an appreciation of the "opposite" coursework.

(c) Visitations to community work places

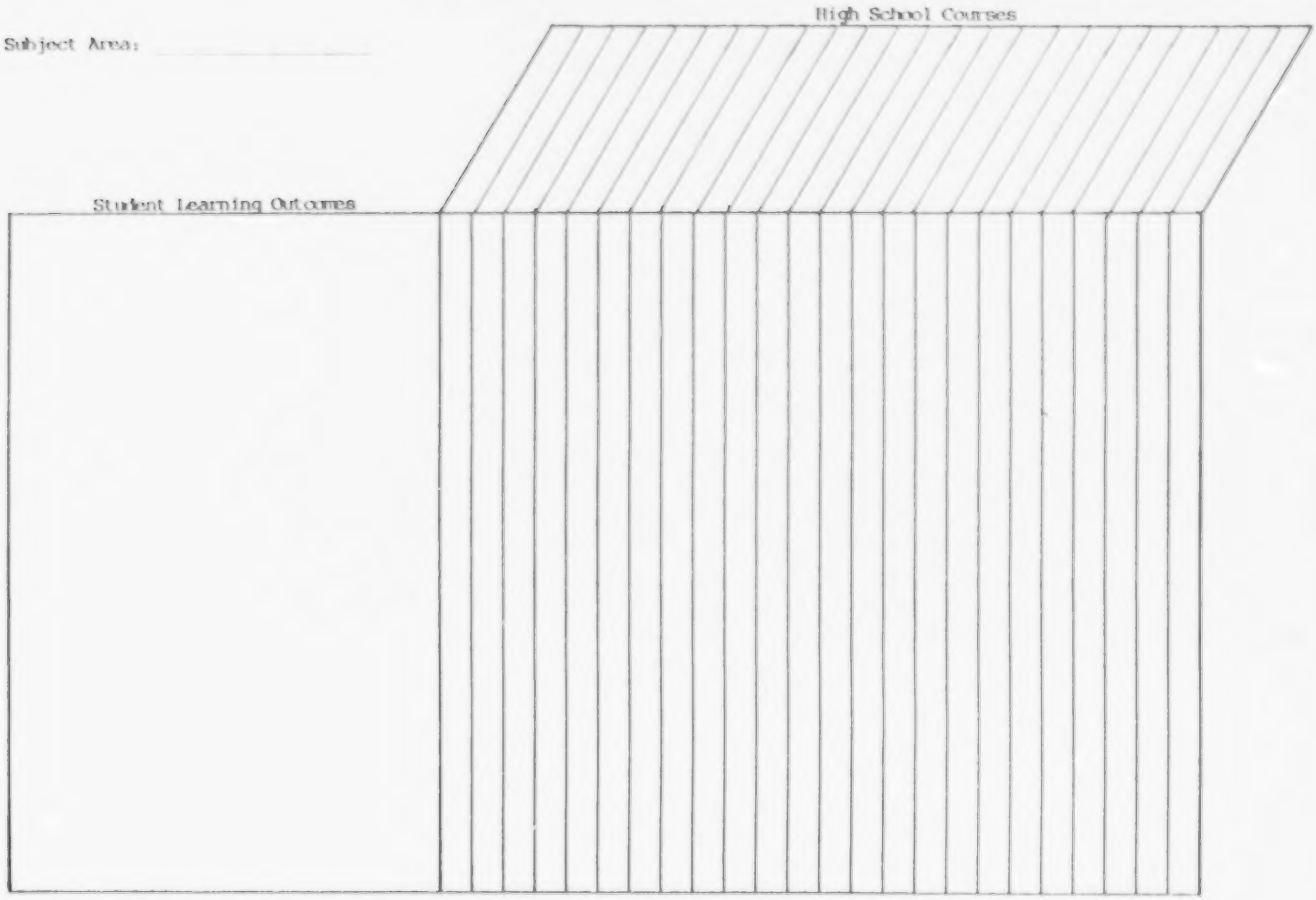
Time might also be set aside for faculty members in the "target" courses to team up for employer site visits. There is no more powerful way for teachers to gain an appreciation of how their subject area is used in real-world settings than by interviewing an employer and analyzing what is happening in everyday job tasks.

An effective tool to use is readily available in vocational education--the task analysis process used to validate vocational curricula through employer advisory committees. However, onsite experience involving teachers from both disciplines, looking at a variety of workers in their daily routines, carries the strongest message. Beware of handing out a ready-made document that someone else prepared!

5. Match up student learning outcomes for comparison

Many districts that award equivalent credit might be hard pressed to prove their case if asked to demonstrate how the credit was awarded. On the other hand, those districts that have developed a systematic process resulting in a visual display of "matched pair" learning objectives can make a strong case. Some districts that have successfully achieved equivalent credit, using curriculum alignment procedures, start by using a matrix like the one that follows.

DELIVERY OF SCHOLASTIC COMPETENCIES



Code: I=Introduce; E=Expand; R=Reinforce; A=Application

Assuming that SLOs have been written for the core program area where equivalency is sought, list these down the left side of the page. Across the top of the matrix, list classes that conceivably address those outcomes. Teachers start this process by simply marking an X at each intersection to indicate a possible match. Computer buffs in the building could probably devise a software program to accommodate this process as well. The task is easier if outcomes are written at a similar level of abstraction so that you're comparing apples with apples.

A more detailed analysis can then occur by enlarging the matrix and allowing the teachers requesting equivalency for a specific course or sequence to provide further details on how their coursework addresses the specified SLOs in the related field:

- Class/lab time spent addressing this outcome
- Homework hours assigned on this topic
- How this topic is addressed (lecture, observation, lab)
- Assessment approach (hands-on, teacher-made test,teacher observation, standardized test)

Appendix C contains some alternative approaches.

6. Determine credit possibilities and transcript designations.

Some school districts have tried to address the "degree of fit" by determining hours spent on various SLOs and either deciding that there will be a one-for-one match or assessing a variable credit based on approximate time allocated to the equivalent subject. More than likely, our teacher teams will decide among themselves where there may be gaps in either theory or practice.

While there may be strong agreement that a particular health occupation's vocational sequence addresses an impressive number of life science SLOs, there may be several concepts that are obviously missing as well. The science and health occupation's faculty members may then determine there should be some additional instructional units added to the health occupation's curriculum to make up for this deficit. These curriculum modules would probably require additional district resources to prepare.

Advice received from transcript evaluators at the University of Washington and Washington State University is to maintain the standard course descriptors for equivalent credit earned in subjects required for high school graduation and college entry. If equivalency had been truly justified using the curriculum alignment process, then there's no need to "pussyfoot" by using titles like "applied math" on the transcript.

7. Keep everyone informed.

Your work does not end with board approval of either the general process or each requested equivalency. The real payoff occurs when administrators, counselors and student advisors (e.g., guide group teachers) assist students with program planning. It is they who must encourage students to earn equivalent credit while accomplishing other personal goals at the same time. This may mean extra information-sharing

on your part to make sure other professional staff are "telling it like it is." Student catalogs must clearly address equivalent credit options. And parents, particularly at middle and junior high school levels, must also have the information they need to help students look at a comprehensive high school experience that includes equivalent credit alternatives.

8. Monitor the process.

1. Does the "equivalent course" department staff feel confident about the coverage of student learning outcomes that were "certified" during the curriculum alignment process? Are those outcomes, in fact, being addressed in a rigorous fashion? Could an impartial observer walk in and expect that certain objectives were incorporated into instructional activities at about the time everyone expected?

2. How are faculty in the "credit granting" department feeling about the process? Do they feel they are welcome to review course activities? Are students "testing out" of the equivalent area if that technique had been built in?

3. Are school clerks entering the credits correctly on transcripts? Have college registrars raised any questions?

4. Are students and parents getting information about the policy? Are counselors providing enough information?

III. QUESTIONS PEOPLE WILL ASK

A. Who should take the lead in initiating equivalent credit discussions?

(1) Letting the academic department take the lead

Some school districts have found the best approach is to toss the ball to the relevant academic departments in a school where closer ties with vocational programs are desired. In this model, you might ask the Department to help your vocational students multiply their potential for employment success by increasing applied basic skills achievement levels. This direct request underlines the importance that all vocational educators place on related training and the critical role that academic preparation plays in occupations today. Hopefully, teachers in these core skill areas will get excited about the ways they can modify instruction to fit the needs and interests of students in one or more vocational program areas.

(2) Letting the vocational department take the lead

As noted earlier, using employers on a task force or advisory committee to help guide and monitor the equivalent credit process helps provide neutral and convincing input when the first doors are being opened. Approach your colleagues in a positive, proactive manner, underlining the common goal you share in providing the best possible educational programs for all students. Including persons from a different discipline on the review committee helps provide new perspectives without as many "turf" issues getting in the way.

Make sure the principal (or at least a principal from one participating school if this is a multi-school effort) is truly on board and has given the green light for planning to proceed. The best advice we can give when vocational staff take the initiative in equivalent credit planning is this: It is a weak rationale to say that offering equivalent credit will "save" programs being impacted by declining enrollment. The benefits to be accrued when academic and vocational outcomes are logically blended in applied settings should be your priority and the only educationally-justifiable reason to proceed.

B. What about teacher certification issues?

We have found that more often than not this can be a "good" reason for someone to say that equivalent credit will not work. When you really dig, however, you may find you are being stonewalled. Some states allow teachers to be "misassigned" as districts try to cope with fluctuating enrollments and new graduation requirements. Many vocational teachers may already be qualified to teach certain academic subjects because of their extensive college preparation. When vocational teachers have come from an industry background, however, and may not have broad academic preparation in related fields, there may be other arrangements that would fill the bill:

(1) the use of "adjunct" faculty who could provide a review and approval role for the curriculum being taught.

(2) an informal teaming arrangement which allows the academic teacher to be listed as the "teacher of record" for those students for whom equivalency credit is being sought. These students would have to pass a test prepared by the academic teacher to certify that learning had occurred.

You would hope, however, that enough groundwork would be laid and trust built so that no one would feel like teacher certification was a problem. Instead of hassling the certification question, time would be better spent designing staff development opportunities to help both vocational and academic faculty strengthen their repertoire of skills for delivering an integrated curriculum that will make more sense to young people.

C. Will in-state and out-of-state four-year institutions accept equivalent credit?

We discussed how the University of Washington (UW) and Washington State University (WSU) regard the equivalent credit issue with an official at each campus who works directly with the analysis of student applications for in-state residents. Essentially we found this is not an issue with admissions officers--depending on how the credit is listed on the student's transcript.

The first "screen" that a Washington high school graduate must pass is the simple determination of whether the student holds a valid high school diploma and whether basic entry requirements at the institution are satisfied. English credits, for instance, can be met by successfully completing any number of acceptable courses, including working on the school yearbook. The UW requires incoming freshmen to have completed at least one year of a laboratory science. To determine whether a particular math credit is acceptable, UW transcript evaluators look for specific wording on the transcript (e.g., geometry, algebra, trigonometry, second year algebra, etc.)

Both the UW and WSU use an admissions index or priority rating which serves as the real determinant. These are based on the applicant's GPA and test scores (the Washington Pre-College being the common one used for students living in the Evergreen State). The Washington Pre-College Service is also beginning to play a key role in summarizing the courses a high school student applicant has taken--which saves college admissions a lot of time in determining whether a student's high school coursework is acceptable. There are three full-time evaluators at the UW who handle the paperwork for in-state applicants. These staff do not have time to do a detailed analysis of transcripts. If a question does come up, the operations manager will write the high school principal asking for details on what a particular course covers. College staff rely on

whatever the principal sends back in the way of a course synopsis or paragraph describing course content. At WSU, if there is a question about a particular math offering, for example, admissions staff will refer the decision to the WSU math department for its recommendation.

Both universities advised that credits earned through equivalency procedures should be listed on the transcript using the "granting" high school department designation. For example, mathematics credit granted through a metals fabrication or construction sequence might be designated as geometry based on the curriculum alignment process described earlier.

D. What are some ways to report equivalent credit on the transcript?

As noted above, if your district has no procedure, the best way is to simply list the credit using the equivalent title and/or course number from the department granting "permission." Some districts require students to complete a sequence of vocational classes before granting a certain amount of credit. One high school designates the equivalency as part of the course title (e.g., the third semester of an electronics sequence allows for equivalent credit in math, so the transcript reads Electronics 3-M with "M" standing for mathematics).

E. What are some of the assessment and testing issues we need to be thinking about in this area?

The 1985 state of Washington legislature passed Senate Bill 4140 effective July 28, 1985 relating to high school graduation requirements. It would have authorized the state board of education to develop rules recognizing the relevance of vocational and applied courses and allowing equivalency credit for such courses.

Specifically mentioned are provisions for competency testing as a way of granting "in lieu of" credit for courses required for graduation. This opens up new opportunities for vocational educators and testing/measurement specialists once the curriculum alignment process is underway. Another place to start in designing assessment instruments is to review the test items included in pre-enrollment screening exams for various community college programs. In any case, the more closely students seeking equivalent credit can match the scores of their peers in "traditional" classes, the better off you are in the long run.

F. What does all this do to the time that teachers have to spend?

Working through the curriculum alignment process is not an easy thing and will certainly not happen overnight. Districts that have been successful report the process takes months of planning and testing before staff begins to feel comfortable. And for teachers who are already facing large class loads and demanding schedules, innovations such as these will seem to be a heavy burden. We recommend that the opportunities to build new alliances between vocational and academic instruction should be open only to those teachers willing to make the necessary investment. After a few of the early pioneers have paved the way, others will follow. When some of the doors have been opened, the payoffs of more satisfied students, parents and employers will be the real reward.

G. What kinds of staff development are needed for this activity?

As noted earlier, the best kind of staff development is to provide time to get to know each other's curriculum and the contexts in which it is used in the real world. This means that staff embarking on the curriculum alignment process need released time, extended contract time, or occasional free periods for joint planning and curriculum development. They need to observe each other's classes and laboratories to see what students are doing and learning; they need to visit business and industry settings to see the kinds of demands employers make on the use of specialized knowledge and skills. Teachers should be able to show a supervisor or visitor exactly where and how they are addressing the equivalent outcomes of another discipline as part of a planned program.

Curriculum development may require outside expertise on how to prepare learning units incorporating new kinds of subject matter. Devising new kinds of approaches to assessment of student skills may require advice on testing or observation guides. And, if teachers discover at the very beginning that they are not familiar with how to write student learning outcomes, assistance from an Education Service District, teacher training institution or other agency may be needed.

H. Are there some scheduling implications we need to keep in mind?

Unlikely, if you are simply pursuing equivalent credit as a single strategy. But if you see advantages in linking up teachers from academic and vocational areas in new ways, (see Appendix A) this naturally requires scheduling considerations. If a math and electronics teacher are going to tie together student learning projects in their advanced classes, then the master schedule must keep that in mind. If a language arts teacher is going to offer two periods of Technical Editing a week to business office students, then what does that mean for the rest of each week?

If a physics teacher and industrial technology teacher are going to team teach an applied physics class for all trades and industry students, then how will the offering be managed?

I. What about additional space, personnel and materials costs?

Space may not be a problem unless you plan to tear down some walls to get classes together. Personnel costs will be for planning and inservice needs. Some districts have turned to using community volunteers as a way to supplement professional staff with experts who are willing to tutor students who need certain basic skills assistance or to provide enrichment in the application of academic skills to on-the-job requirements. Retired persons are a rich resource and can often help students discover a great deal about problem-solving that textbooks can't teach. Materials could require moderate investment. If a vocational teacher is looking for a selection of commercial materials to bolster applied skills in labs and field settings, most publishers can oblige.

Here is another way to involve the local vocational advisory committee, however. Asking for materials used on the job and examples of everyday problems from the workplace can help students see how academic and vocational skills are blended in the workplace.

IV. RESOURCES TO CONSIDER

I. READING AND LANGUAGE SKILLS

University of Missouri-Columbia, "Remedial Reading Vocabulary Modules." This is a series of audiovisuals for improving terminology comprehension. Each set consists of approximately 100 terms common to a particular vocational area (e.g., food service, building maintenance, small engines, automotive technology, health occupations). Contact Instructional Materials Laboratory, 10 Industrial Education Building, University of Missouri, Columbia, Missouri 65211.

Incardone, Peter. Teaching Students to Read Better. Professional Development Series No. 6, 1982. Published by the American Vocational Association, 1410 King Street, Alexandria, VA 22314 (703-683-3111). This is a concise guide for vocational teachers covering such issues as why students have trouble reading, tips on teaching essential technical reading skills, assisting the bilingual student and using other resources on the school staff.

Vocational Instructional Materials Laboratory, A New Look at an Old Skill: Reading in the Vocational Classroom. The Ohio State University, Columbus, Ohio 43210. This is a well-done handbook for vocational teachers that admits vocational instructors will not likely become reading specialists--but they can help students read technical materials better with a few tips and ideas. Activity ideas include vocabulary, word recognition, word meaning and comprehension.

Division of Vocational Education, State Department of Education, Columbus, Ohio. Communication Skills I: Reading Skills, Writing Skills, Using a Newspaper and Communication Skills II: Using the Telephone, Conducting a Meeting, Making a Speech. 1983. These two teacher guides are aimed at vocational teachers who choose to help students increase reading, writing and general communication skills. Examples are used from vocational settings.

Lotto, Linda S. Building Basic Skills: Results from Vocational Education. Research and Development Series No. 237, The National Center for Research in Vocational Education, The Ohio State University, 1983. This well-done synthesis of the literature on how vocational students compare to "academic track" students provides good basis for thinking about strategies for improving the basic skills of students in high school vocational courses.

Suter, Paul. "Teaching a New Kind of Shop Talk." VocEd Journal Vol. 59, No. 5 (August 1984): 31. This article describes an in-school partnership between Suter, a communications skills instructor at Chemeketa Community College in Salem, Oregon and Bob Dixon, head of the machine/mechanical department on the same campus. The instructors enrolled in each other's classes to get a better idea of how the subject matter in their courses interrelates.

II. MATHEMATICS SKILLS

Project STAMM and the Georgia Department of Education. Vocational Applied Mathematics--a series of self-study workbooks in traditional vocational fields. Order auto mechanics, auto body, food services, construction, health occupations, metals, electronics, and electromechanics from Sopris West, Inc., 1120 Delaware, Longmont, CO 80501; order industrial arts, cosmetology, drafting and graphic arts from Ronda Packer, Vocational Education Materials Center, University of Georgia, Green Street, Athens, GA 30602.

Illinois State Board of Education. Generalizable Mathematics Skills Assessment User Manual and Resource Directory. 2 volumes. 1984. These two manuals by the Department of Adult, Vocational and Technical Education are designed to show teachers how to identify and address the common math skills that cut across a number of secondary vocational programs. Color-coded charts quickly identify basic math applications and tasks from various occupational areas. Student skill inventories are provided. The resource directory lists a wide variety of instructional materials and provides publisher addresses.

III. SCIENCE

Principles of Technology. Nearly 40 states have pooled resources to help support development costs for this unique two-year applied science and math curriculum aimed particularly at vocational students. When development is completed there will be 104 laboratory exercises, 52 teacher demonstrations, and approximately 500 minutes of video instruction. Codevelopers are the Center for Occupational Research and Development (CORD) in Waco, Texas and the Agency for Instructional Technology (AIT) in Bloomington, Indiana. Prototype testing for the first year curriculum has been under way in 1985-86 and participating school districts in the consortium states who opt for the full two-year cycle will continue testing the materials in 1986-87.

The curriculum exposes students to 14 physics principles as they are applied to four "systems" commonly found in a number of vocational areas: fluid systems, electrical systems, mechanical systems and thermal systems. The costs to equip a classroom can run from $30-$50,000 with teacher inservice also required for proper implementation. Some districts have selected physics or physical science teachers to offer the PT curriculum while others have chosen vocational teachers with a strong science/math background. Districts have opted to offer the PT course both as science as well as vocational credit. The state of Texas recognizes PT as the equivalent of physics.

An introductory video tape is available to orient potential adopters and several states offer summer workshops for implementing districts. Idaho and Oregon each have two adoption sites with other schools in the planning stage. For information, contact CORD at 800-231-3015 or AIT at 800-457-4509.

IV. MODEL STATE PROGRAMS

Kentucky. "Joint Academic Vocational Approach (JAVA) to Education in Kentucky: Procedures Guide." Kentucky Department of Education 1983. The JAVA model was designed and tested in several Kentucky school districts. Academic instruction is correlated to vocational education at the ninth grade level after common skills and tasks are identified. Learning activity packages are developed. A steering committee representing participating high school and vocational center staff is suggested.

Ohio. The Division of Vocational and Career Education in the Ohio Department of Education has developed a series of program options that encourages local vocational programs to introduce related academic instruction and still qualify for state vocational funding. A number of scheduling models are outlined to accommodate the variety of delivery systems available in that state. Model curricula are under development in cooperation with the Division of Elementary and Secondary Education in the agency. Contact Sylvia Price, Division of Vocational and Career Education, Ohio Department of Education, 65 S. Front St., Room 907, Columbus, Ohio 43215.

New York. The State Department of Vocational Education in New York has been involved in a several-year reform effort that is resulting in a number of significant changes in occupational curricula. Two important changes include the addition of specialized classes for vocational students in two areas: Occupationally-Related Math and Occupationally-Related Science. Both will be available for locally-granted diplomas rather than for the Regents diploma.

V. STAFF DEVELOPMENT

R&R Evaluations in Atlanta, Georgia previewed a new staff development program it has under development at the American Vocational Association's 1985 convention. Titled "Basic Skills Instruction in Vocational Education," the 17-hour inservice will feature video tapes of vocational teachers addressing basic skills objectives as a natural part of vocational courses. The films are high-quality, professionally produced videos showing actual classroom situations with student-teacher interaction. An instructor's guide and study guide for participants is included in the basic price. A short video explaining the project is available from R&R Evaluations, Inc., 968 Ralph McGill Blvd., Atlanta, GA 30306 (404-897-1386).

Lucille Campbell-Thrane, et. al. Building Basic Skills: Models for Implementation. Special Publications Series No. 41. The National Center for Research in Vocational Education, The Ohio State University, 1983. The report suggests three ways to improve vocational students' basic skills proficiency using an integrated (infused in vocational education courses), non-integrated (separate, "tailored" classes), or a combination approach. A listing of vocational teacher competencies helpful in assisting students in improving their basic skills is provided.

Oregon Department of Education and Oregon State University. Five handbooks designed for vocational educators looking for ways to reinforce basic skills in vocational classrooms. Titles include: Computer Skills, Mathematics, Reading, Speaking/Listening, Writing. Available at $4.50 each title from Oregon Career Development Consortium, Marion Educational Service District, 651 High Street N.E., Suite 4, Salem, Oregon 97301.

National Center for Research in Vocational Education. "Basic Skills...Are Vocational Teachers Ready?" Research and Policy Review, 1983. This short flyer summarizes a larger research document titled "Vocational Education Preparation to Improve Secondary Students' Basic Skills: An Exploratory Study." Faculty and students at nine vocational education teacher education institutions felt they are doing a reasonable job of anticipating the need to help high school vocational students with basic skills, but are reluctant to share the responsibility alone.

American Vocational Association. Voc Ed Journal Vol. 59 No. 2 (March 1984). This issue's theme is "Teaching the Right Stuff: Where It's Happening Today." Six articles by teachers and a former vocational student discuss how academics and vocational programs must be intertwined. Math and science are the dominant themes.

Hoffman, Kirby. "Put an Academic Teacher on Your Advisory Committee." Voc Ed Journal Vol. 60 No. 5 (August 1985):27. The author, a word processing teacher in Pontiac, Michigan found real benefit when an English teacher was added to his industry advisory committee and when the nonvocational personnel were given important work to perform on the committee.

The National Center has developed new materials for both administrators and teachers. Category M--Assisting Students in Improving Their Basic Skills is part of the well-known Performance-Based Teacher Education (PBTE) module series. Each of the six new self-contained, self-paced modules presents (1) information about strategies for teaching the basic skills; (2) specific instructions, examples, and exercises for teaching the basic skills; and (3) a checklist for assessing teacher competency. Teachers may use the modules individually or in group instruction, working in both cases under direction of a trained resource person. The six modules, listed below, are among the more than 125 in the PBTE series:

- M-1 Assist Students in Achieving Basic Reading Skills
- M-2 Assist Students in Developing Technical Reading Skills
- M-3 Assist Students in Improving Their Writing Skills
- M-4 Assist Students in Improving Their Oral Communication Skills
- M-5 Assist Students in Improving Their Math Skills
- M-6 Assist Students in Improving Their Survival Skills

For administrators who must manage basic skills instruction, the new item is Improving the Basic Skills of Vocational-Technical Students: An Administrator's Guide. This instructional guide covers all the critical areas in which administrators must be proficient to operate programs that boost students' basic skills. It discusses what skills are "basic," the administrator's role in basic skills improvement efforts, possible program types and approaches, and the steps required for planning, implementing, and evaluating such programs.

APPENDICES

APPENDIX A: BACKGROUND

Why All the Talk About Academic and Vocational Integration?

While educators are reaping the benefit of heightened public awareness, there are more than a few dark clouds on the horizon: taxpayers ask if they are getting full value for their dollar; dropout rates seem to be on the rise--attributed in part, some say, to increased graduation requirements in "solid" subject areas; alternatives to traditional programs are emerging regularly, both in-school and outside the regular system.

In secondary schools, the Carnegie system is the common format that American schools have adopted to measure learning outcomes. And as dozens of national studies and reports have emerged over the past five years, policy makers have increased academic requirements in hopes that more time in mainline content areas will increase achievement levels and assure America's competitive edge in the future. The result has been fewer electives for students, particularly in school systems that hold to a traditional six-period day. With some notable exceptions, enrollments in many of the so-called liberal arts and "practical" arts options are falling across the country, particularly if a program's reputation is marginal.

In the meantime, technology is changing the workplace at an incredible rate.

The point is this: Business, industry and just plain common sense demand that our graduates must cope with ever more complex work environments. Our job is to apply the best elements of integrated instruction using today's context and technology.

Are There Other Approaches to Integration of Academic/Vocational Subjects?

Equivalent credit--e.g., awarding math credit for the theory and practical application found in electronics--is but one approach that states and localities are using as they attempt to restore the historic connections between academic and vocational instruction. There are at least five other variations of academic/vocational integration designed to accomplish different purposes. Following is a brief description of each:

1. Infusion of vocational content into academic coursework

While some would say that career education is no longer a viable concept, we can point to many instances where school staff have creatively infused occupational concepts and skills into ongoing academic coursework, just as the original developers of career education models envisioned. The math and science specialists in one large district proposed two new "applied math" and "applied science" courses to meet new state requirements with components that speak directly to the career and consumer roles that adults face. Working with the Career and Vocational/Technical Department in this urban district, the same specialists created a series of 15-minute radio interviews with

Portland-area workers who use science and math in their daily tasks. The 12 interviews ranged from television meteorologist to plumber, from high tech engineer to machinist. In another project involving a collaborative arrangement with local business and industry, drop-out prone students who have not yet declared a "track" may enroll in a class that combines employability skills and work experience with two additional courses: Partnership English and Partnership Math. The academic teachers assigned to these classes use a curriculum that focuses directly on the kinds of "hands-on" experiences these youngsters are encountering in the work experience component.

2. Related Instruction

A second trend is toward related instruction either taught by the vocational teacher or by a different teacher entirely--perhaps even from the related academic department. An interesting variation here is to utilize an instructional aide, volunteer adult tutor from the community, or peer (student aide). The primary purpose of this approach is to help students who may be having difficulty mastering some of the basic skills that are essential for successful completion of a vocational sequence. Some schools rely entirely on vocational instructors to provide any necessary assistance to students right on the spot. Others utilize "brush up" units or workbooks, available commercially, which students can use independently to learn and practice the neccessary skills. In some states, and in Washington's area skills centers, where students attend a full- or part-time vocational school allowing for at least three hours of classroom and laboratory activities, it is possible to find enrichment and remediation in basic skills sandwiched into the classroom and laboratory hours otherwise labeled as vocational time.

3. Tailored Courses

Washington is one of several states that encourage districts to offer specially-developed courses such as Technical Math, Business Communications, and the like.

On the other hand, some states and localities have embarked on new curriculum development which will directly provide academic skills vocational students will use regularly.

There are some new and interesting developments, however. One state's English supervisor, for example, suggested a new language arts unit might be met by creating a course called Technical Writing which would feature vocabulary and composition skills called for in vocational areas. Since most of us are called on to accurately read and write complex directions, manuals, memos, technical directions, diagrams, and instructions it makes sense that a semester could be devoted to targeted reading and writing skills in a particular vocational field, with vocational staff and advisory committees helping to supply the examples and content.

Principles of Technology, a curriculum being prepared jointly by the Center for Occupational Research and Development in Waco, Texas and the Agency for Instructional Technology in Bloomington, Indiana, is now in its second year of development. Designed for use at the secondary level, this two-year curriculum takes the point of view that vocational students

(and students in the general and college bound track as well) would benefit from an applied physics sequence that demonstrates how physical science concepts are used in everyday occupational applications. More than a dozen cross-cutting themes (e.g. power, energy) are introduced using correlated video instruction and printed materials.

Lectures and hands-on laboratory demonstrations are regular activities as well. Reports from test sites around the nation (Washington state is not participating) are extremely positive, and for many students this is exactly the kind of applied science they need--not only to master the theory and problem-solving outcomes which physics offers but to acquire essential technological understanding they will need for hundreds of career fields in the future.

4. Team Instruction

What we see in this approach closely resembles the instructional strategies that were so popular in the 1960s and early 1970s: team teaching and other programming arrangements which encourage joint curriculum planning and delivery. In at least one state where there are many strictly vocational high schools, the almost unheard of addition of math, science, and English instructors to the faculties has taken many forms: Sometimes the academic faculty member will be assigned right in the classroom/laboratory setting of each occupational area on a daily or every-other-day basis. Sometimes the academic skills will be taught during the transition times when some students are returning to a home high school for the remainder of their school day. The interesting thing to note here is flexibility by state officials in recognizing the importance of providing vocational funding for related academic instruction.

Such interdisciplinary approaches to learning are not new. A Denver high school that received national attention in the early 1970s for its unique construction cluster program assigned an English and math instructor alongside the construction teacher for a three-hour block of time. The math teacher might be found demonstrating a geometric principle, using the carpenter's square as joists were being cut, while the English teacher works with another group using unpainted gypsum board to write out an example of grammatical usage. Students received credit three ways in this program: in English, in math and in construction.

5. Individualized Approaches

There are both formal and informal strategies that have evolved over the years that can be utilized to award credit for real or assumed learning. Some states now have wording in regulations allowing for "in lieu of" credit or waivers for certain requirements if in the opinion of local officials such action is warranted. We know that many principals and counselors have for years awarded credit for hardship cases or unusual circumstances on a "case by case" basis.

While these individual decisions are certainly justifiable, other approaches can be used to document a student's competence in a particular field, sometimes even if the student never completes an actual course.

Some schools will allow a student to earn credit in certain classes by "challenging" the course. In those instances, a teacher-developed test will be administered and if the student can demonstrate mastery, credit is awarded.

Certain secondary school programs have developed sophisticated systems for developing learning contracts with students. In these individualized, competency-based programs, student and staff agree that certain objectives must be accomplished using predetermined criteria for measurement. Often there will be a variety of approvals and participants in the process--perhaps parents, other school staff, and community experts.

6. Curriculum Alignment

This concept has emerged as a part of overall school improvement efforts to create a better match between stated school outcomes, course content and delivery, and assessment. We can apply this model here since it illustrates how the notion of equivalent credit should be approached. Some agencies may use different terminology--integrated credit, cross credit, substitute credit, dual credit, dual enrollment, or variable credit--but they mean essentially the same thing: lining up common skills in more than one curriculum area and agreeing that one context is as justifiable as another for teaching those skills.

Appendix B contains a copy of a survey conducted by the Washington Association of School Administrators in October which features the latest look at how the districts that responded are approaching the equivalency credit question. While it is difficult to say if all these districts conducted a rigorous analysis to justify their "curriculum alignment", we know from discussions in the Northwest and nationally that it is growing more risky to simply assume there is X amount of academic content embedded in a particular vocational class or sequence. While such "seat of the pants" approaches might have worked in the past, even the smallest districts, that operate more flexibly, may need to justify local decisions to award credit.

APPENDIX B

1985 SURVEY OF SELECTED DISTRICTS IN WASHINGTON
OFFERING EQUIVALENT CREDIT

An informal survey of district vocational administrators who attended the October 23, 1985 meeting of the Washington Association of Vocational Administrators and who completed a checklist provided the trend patterns indicated below:

VOCATIONAL AREA:	EQUIVALENCY OFFERED BY ONE OR MORE DISTRICTS IN:	
Agriculture	Math	2
	Science	49
Business Education	English	48
	Math	40
	Social Studies	5
Health Occupations	Health	6
	Science	3
Home Economics	Health	7
	Math	3
	Social Studies	2
	Physical Education	2
Marketing	Math	1
	Social Studies	1
Trade and Industry	English	1
	Math	8
	Science	12

Switching point of view, here is another look at the findings:

EQUIVALENCY AVAILABLE	VOCATIONAL PROGRAM AND NUMBER OF DISTRICTS OFFERING CREDIT	
Science	Agriculture	49
	Trade and Industry	12
	Health Occupations	3
English	Business Education	48
	Trade and Industry	1
Math	Business Education	40
	Trade and Industry	8
	Home Economics	3
	Agriculture	2
	Marketing	1

Health	Home Economics	7
	Health Occupations	6
Social Studies	Business Education	5
	Home Economics	2
	Marketing	1
Physical Education	Home Economics	2

DISTRICTS REPRESENTED IN FALL 1985 SURVEY

The following Washington state districts reported at least one equivalent credit offering in place in October 1985. The survey form was completed by the district's vocational education coordinator.

Arlington
Auburn
Bainbridge Island
Battle Ground
Bellevue
Bethel
Bremerton
Brewster
Castle Rock
Centralia
Central Valley
Concrete
Dayton
Deer Park
Eatonville
Elma
Enumclaw
Ephrata
Everett
Evergreen
Federal Way
Franklin Pierce
Freeman
Grand Coulee Dam
Grandview
Highline
Issaquah
Kelso
Kent
LaCenter
Lake Washington
Liberty
Longview
Lower Snoqualmie
Marysville
Mary Walker
Mead
Mercer Island
Moses Lake
Mt. Vernon
Mukilteo
Napavine
Newport
North Kitsap
Northshore
Omak
Peninsula
Prosser
Pullman
Quincy
Reardan/Edwall
Renton
Seattle
Shelton
Shoreline
Snoqualmie Valley
South Central
South Whidbey
Spokane
Stanwood
Steilacoom
Sumner
Sunnyside
Tacoma
Tahoma
University Place
Vancouver
Vashon Island
Walla Walla
Wapato
Wenatchee
West Valley
Yakima
Yelm

APPENDIX C

MODELS FROM SELECTED DISTRICTS

To demonstrate the variety of approaches districts are using to equivalency credit in Washington, procedures from the following districts have been included here as models to consider: Edmonds, Evergreen and Federal Way.

Alternative approaches to building a "rationale" matrix for demonstrating equivalency are shown from Sno-Isle Skills Center (machine trades math) and from the state of New Jersey (automechanics).

EDMONDS SCHOOL DISTRICT NO. 15 12/16/85

INSTRUCTIONAL SERVICES DIVISION

Equivalency Courses

General Information

A. In order for a student to satisfy a graduation requirement through an equivalency course, the sequence of study as specified in the equivalency descriptions (attached) must be completed.

B. Those teachers who teach courses which satisfy graduation requirements through equivalencies should automatically become active members of the academic council for which equivalencies are granted. (For example: Horticulture receives Science equivalency, so the Horticulture teacher becomes a Science Council Participant.)

C. Courses which are granted equivalency status must receive regular monitoring by the Instructional Services Division to insure that the criteria are being incorporated into the curriculum.

D. As a part of the yearly evaluation of the total Graduation Competency Project, equivalency courses will be reviewed to reaffirm or remove their equivalency status. Specific procedures and criteria for the annual evaluation of equivalency courses will be developed by January, 1987.

E. The Curriculum Policy Committee recognizes the need to assure counselor availablilty to students and parents in order to accomodate the success of the equivalency process.

Utilization of the 4-year plan and closer involvement with parents in the registration process will insure the incorporation of the equivalency concept. The Curriculum Policy Committee further recommends that financial resources be committed to this task.

Equivalency Courses 12/16/85

	Title	Sequence of Study	Equivalency Granted (semesters)
The Arts			
1.	Creative Writing (Eng 570)	1 hr/1 sem	1
2.	Dance (PHE 450)	1 hr/1 sem	1
3.	Housing/Interior Design (HEC 460)	1 hr/1 sem	1
4.	Metal Sculpture (IAR 440)	1 hr/1 sem	1
5.	Film As Art (Eng 515)	1 hr/1 sem	1
6.	Vocational Ornamental Horticulture (Voc 455)	2 hrs/2 sem	1
7.	Photographics (IAR 610)	1 hr/2 sem	1
8.	Mythology (Eng 616)	1 hr/1 sem	1
9.	Mass Media I (Eng 520)	1 hr/1 sem	1
10.	Graphic Communication (IAR 770)	1 hr/2 sem	1
Communications - Senior Year			
1.	Business Communications (Bus 320)	1 hr/1 sem	1
2.	Media Communications (Voc 790)	2 hrs/2 sem	1
3.	Health Occupations (Voc 055)	2 hrs/2 sem	1
4.	English 12 (Eng 400)	1 hr/1 sem	1
5.	English 12 (CP) Eng 450)	1 hr/1 sem	1
6.	English 12 (AP) (Eng 460)	1 hr/1 sem	1
7.	Advanced Drama (Eng 510)	1 hr/1 sem	1
8.	Advanced Speech (End 555)	1 hr/1 sem	1

	Title	Sequence of Study	12/16/85 Equivalency Granted (semesters)
Science			
1.	Vocational Electronics Advanced (Voc 510 plus 520)	2 hrs/2 sem	2
2.	Electronics (IAR 310)	1 hr/2 sem	1
3.	Health Occupations (Voc 055)	2 hrs/2 sem	2
4.	Vocational Horticulture (Voc 430)	2 hrs/2 sem	2
5.	Vocational Ornamental Horticulture (Voc 455)	2 hrs/2 sem	2
6.	Advanced Automotive Technology any of the following sequence of Auto Shop courses - to total (Voc 300, 320, 330, 340) (IAR 140, 150, 160)	1 hr/8 sem 1 hr/4 sem	2 1
Math			
1.	Computer Programming 1 & 2 (Com 200)	1 hr/2 sem	2
2.	Electronic Math Application (Bus 360)	1 hr/1 sem	1
3.	Accounting 1 & 2 (Bus 100)	1 hr/2 sem	1
4.	Accounting 3 & 4 (Bus 200)	1 hr/2 sem	1
5.	Advanced Auto Technology any of the following sequence of Auto Shop courses - to total (Voc 300, 320, 330, 340) (IAR 140, 150, 160)	1 hr/4 sem	1
6.	Vocational Electronics Adv. (Voc 510 plus 520)	2 hrs/2 sem	2
7.	Electronics (IAR 310)	1 hr/2 sem	1
8.	Photo/Graphics (IAR 610) Graphic Comm.1/2 (Voc 750) Graphic Comm.3/4 (Voc 760) any sequence of the above course to equate	1 hr/4 sem	1

	Title	Sequence of Study	Equivalency Granted (semesters)
9.	Drafting (IAR 220, 230, 240)	1 hr/4 sem	1
10.	Restaurant Foods (Voc 100)	3 hrs/2 sem	1
11.	Carpentry (Voc 610, Voc 620)	2 hrs/2 sem 3 hrs/2 sem	1 1
Social Sciences/Humanities			
1.	Humanities (Eng 600)	1 hr/1 sem	1
Occupational Education			
1.	Science Lab Assistant (SCI 600)	1 hr/2 sem	1
2.	Instrumental Ensemble (Mus 140)	1 hr/2 sem	1
3.	Symphonic Orchestra (Mus 220)	1 hr/2 sem	1
4.	Instrumental Jazz Ensemble (Mus 150)	1 hr/2 sem	1
5.	Vocal Jazz Ensemble (Mus 370)	1 hr/2 sem	1
6.	Vocal Ensemble (Mus 360)	1 hr/2 sem	1

SUBJECT - UNITS	STUDY TEXT OR MATERIALS	STUDY HOURS / HOMEWORK HOURS	ACTIVITIES * EVALUATION
SECOND SEMESTER First Year cont.			
F. Plane Trigonometry	Text C pg. 232-291	20 / 15	L, D, HA
1. Trig Ratios - What are they?	Class Lectures		T
a. The six ratios and triangles			
b. Reciprocal ratios (functions)			
2. Finding Unknown Angles	Class Handouts		
a. Knowing two sides and a right angle	Machinist's Handbook		
b. Trig tables - explained			
c. Solve using tables			
d. Calculator solutions			
e. Decimal conversion from D.M.S. (interpolation)			
3. Finding Unknown Side From Given Side and Angle			
a. Using trig tables			
b. Using calculator			
c. Shop applications			
4. Shop Applications			
a. Sine bars and precision angles			
b. Central angle problems			
1. Bolt circles			
2. Isosceles triangles			
c. Tapers in machinist work			
d. Shop Problems			

* L=Lecture D=Demonstration T=Test E=Work Book Examination HA=Hands On Application
U=Shop Unit Q=Work Book Quiz

FEDERAL WAY SCHOOL DISTRICT 210

*STUDENT REQUEST FOR EQUIVALENT CREDIT

School: _____ Date: _____

Student Name: _____ File Number: _____

Please count the following course, _____

as an equivalent credit in meeting the district graduation course requirement in the area of _____ _____

ADDITIONAL COMMENTS:

_____

_____

_____

_____

_____

_____

_____

_____

Parent/Guardian Approval: _____ Date: _____

Principal Approval: _____ Date: _____

Counselor records on transcript: _____ Date: _____

* Submitted within the first four weeks of the semester

Copies: Principal
Student
Counselor

8-85
Form R5122.3-A

HIGH SCHOOL CROSSOVER/EQUIVALENT COURSES R 5122.3

The Federal Way School District recognizes the need to help students pursue individual career goals as they comply with graduation requirements. The District will provide the opportunity for students to fulfill a limited number of required credits on an equivalent credit basis. Courses accepted as equivalent (based on similar objectives and content) will be those established according to the District Learning Division process and will be consistent throughout the District. Within the first four weeks of a semester, students must declare in writing, the Department in which the equivalent credit will be applied. Out of the 45 credits required for graduation, a student can use a maximum of two credits for cross-over equivalency.

COURSE	EQUIVALENT CREDIT IN
Drama	Occupational Requirement
Annual	
Commercial Art	
Music Courses	(Must be based upon a student's demonstrated occupational goal. Approval is determined at the building level).
Journalism	
Computer Programming	
Aviation Ground School	
Economics	
Accounting 1,2,3,4	Math
Recordkeeping	
Personal and Money Management (also called Consumer Math or Consumer Education)	May not be taken in lieu of Math Lab as a senior if failed Math Competency Test.
Computer Programming 1,2	
Electronics Related	
Carpentry	
Commercial Foods	
Plastics Technology	

COURSE	EQUIVALENT CREDIT IN
Business Communications	English
Visual Communications	May not be taken in lieu of English Lab as a senior if failed any section of the English Competency Test.
Medical Assistant	
Business Law	Social Studies
Business Principles	Approved as senior elective.
Health Awareness	Health
Horticulture 3,4	Science
Natural Resource Management 1,2,3,4	
Marine Technology	

A "Student Request for Equivalent Credit" form is to be submitted within the first four weeks of a semester. (See Attachment A)

The procedure for proposing and approving a course for equivalent credit has been established to coincide with the procedure for approving new District course offerings. A certificated teacher or building administrator completes the "Request for Equivalent Credit Course Approval" form as designated by the adopted timeline. (See Attachment B)

Approved: August 12, 1985
Amended: September 23, 1985

FEDERAL WAY SCHOOL DISTRICT
Federal Way, Washington
Request for Equivalent Credit Course Approval

Submitted by: _____ Building: _____

Present Course Title: _____ Department: _____

Grade Level (if applicable): _____

Proposed Equivalent Credit Department: _____

Grade Level (if applicable): _____

A. Brief Description of Course Content:

B. Course Objectives Related to Equivalent Credit Department:

1. _____
2. _____
3. _____
4. _____
5. _____

C. Text and Supplementary Materials Used:

1. _____
(Department Head Signature)

2. _____
(Principal's Signature)

3. _____
(Director of Curriculum)

4. _____
(Advisory Council)

5. _____
(Learning Division)

FEDERAL WAY SCHOOL DISTRICT 210

APPROVAL PROCEDURE FOR EQUIVALENT CREDIT

1

District Staff
Initiate proposal
Submit to Director of Curriculum
By December 1 for the
Following School Year

2

Subject Area Advisory Council
Review proposals - make
Recommendations to Learning Division
By February 1

3

Principals
Review Advisory Council recommendation
Make comments to Learning Division

4

Learning Division
Reviews recommendation from Advisory
Council and principal's responses
and makes recommendation to Superintendent

Executive Team

Special Committee

5

Superintendent
Receives input from
groups and/or individuals

Consultants

Principals

6

Superintendent makes
Decision and informs
Board of Education

7

Staff is informed
of final decision
by the Learning Division before
March 1 for the following
year's Registration Booklets

8-85

EQUIVALENCY

CREDIT

PROCEDURE

EVERGREEN SCHOOL
DISTRICT NO. 114
VANCOUVER, WASHINGTON

EQUIVALENCY CREDIT PROCEDURE

Definition: An equivalency credit (or cross credit) is the granting of full or partial graduation credit for a specific subject area to an elective area course. For example, granting a graduation credit for a lab science requirement to an Agriculture 1 and 2 class.

Purpose: With the increase in high school graduation requirements, the equivalency credit process expands a student's choice of required and elective classes.

History: In 1984 the secondary principals, prompted by their concern for the elective classes, requested that an equivalency credit (also called cross credit) system be established in the Evergreen School District. A committee, which included four teachers, two administrators, and a representative from curriculum, special education, high school counselors, voc. ed., and the Skills Center, was created to develop a procedure for an equivalency credit system. The committee met during the 1984-85 school year; and in the spring of 1985, they presented an application form and a review process to the principals.

Equivalency Credit Guidelines: The following are recommendations presented by the Director of Secondary Education and the Equivalency Credit Committee:

A. All schools offering the elective course for which equivalency credit is being made must meet with the impacted department for input on the application form. Example: Agriculture 1 and 2 at Mt. View must meet with the Science Department at Mountain View and Evergreen.

B. Should only one school have the elective course that is approved for equivalency credit, another school can offer the same course at a later date without going through an application process. Example: A course in House and Lawn Plants at Wy'east is accepted as an equivalent credit course in Agriculture. After some years, Pacific decides to offer the same class. Pacific can offer this class as an Agriculture credit without making application if they establish the same course description and content.

C. The equivalency application form and accompanying information sheet will be picked up by the applicant from the Director of Secondary Education's office. All secondary principals will be notified by the Director that an application is being considered and the subject area it will impact.

D. Review Committee members, with the exception of the Director of Secondary Education, will normally serve for a two-year period; however, the following schedule will apply for the first term:

.Director of Secondary Education
.Principal (two years for the first term)
.Curriculum representative (one year for the first term)
."Core" teacher (two years for the first term)
."Elective area" teacher (one year for the first term)

The Committee recommended that there be a designated alternate for the curriculum representative and the two teachers. It was also recommended that the alternate be used if these positions are directly involved in the impacted area.

Current Review Committee members are:

Jack Wright, Director of Secondary Education
Hugh Shuford, Principal, Covington Junior High School
Tom Brzoska, Mountain View High School
Randy Frasier, Wy'east Junior High School
Donna Ray (alternate), Mountain View High School
Gary Wallace, Curriculum Coordinator

E. Deadline: November 30 deadline for submitting application to Review Committee

January 15 deadline for decision by Review Committee

F. Reassessment: A representative of the Review Committee and the impacted department will evaluate the equivalent course's curriculum. At the end of the first year, they will, if necessary, recommend course changes and establish the date for the next course evaluation.

Should a staff change occur within a school, the equivalent course will be evaluated by a representative of the Review Committee and a representative of the impacted area at the end of the school year.

G. Student access to courses: The committee recommends that a student may sign up for an equivalency credited class during general registration times, as opposed to an individual petition process.

Equivalency Credit Application: (see attached form)

gw/kc

INSTRUCTION FOR EQUIVALENCY CREDIT APPLICATION

It is extremely important to consider the steps listed below when making application for Equivalency Credit. (Note: "Impacted" course, or subject mentioned in this application, refers to a course or subject that is already established for graduation credit.)

A. CRITERIA:

The applicant must complete items 3 and 4 in order to accurately determine the proposed Equivalency Credit course's curriculum.

B. DISCUSSION:

The applicant will meet with the impacted department(s), or a representative group, at the schools where the proposed course will be taught. The purpose of this meeting is for the applicant to receive input from the impacted areas. Include, if possible, in this discussion the textbooks and other instructional material that will be used in the proposed course.

C. RECOMMENDATIONS:

Prior to submitting the application to the Review Committee, the applicant must request a recommendation for the proposed Equivalency Credit course from the impacted department(s). This recommendation is to be sent directly to the Director of Secondary Education and must arrive no later than November 30.

D. ACTION ON APPLICATION:

A Review Committee, consisting of the following members, will meet and make a decision by January 15:

- .Director of Secondary Education
- .Principal
- .Curriculum Representative
- ."Core" Teacher
- ."Elective Area" Teacher

The applicant will receive written acceptance, or rejection, of the application within ten school days.

EVERGREEN SCHOOL DISTRICT NO. 114

Equivalency Credit Application

Name _____ Date _____

School _____

1. Proposed equivalent course title:

   _____

2. Department for which the equivalent credit will apply (i.e., math, English, science):

   _____

3. Provide the specific high school graduation requirements this course will fulfill.

   _____

   _____

   _____

4. List the proposed equivalent course's SLO's and course outline, including units taught and time allotted for each unit. Compare this list with the impacted subject area's SLO's and course outline. (Attach to this form.)

   _____

   _____

   _____

5. List department(s) and individual(s) with which this application was discussed.

   _____

   _____

   _____

Completed application form must be turned in to the Director of Secondary Education by November 30.

AUTO MECHANICS

| | NUMBER THEORY | C104 (.02) Exponents | C108 (.01-.03) Rational num. | C120 (.01-.06) Equiv. Fractions | C132 (.05) Round Decimals | C136 (.01-.02-.04-.05) Reciprocals | C128 (.03) Absolute value | OPERATIONS | C216 (.01-.06) Fractions | C220 (.01-.02) Ratio | C236 (.01-.07) Decimals (•.-) | C240 (.01-.02) Decimals (-.•) | C244 (.01-.02) Decimals (•.•) | C248 (.01-.03) Convert Frac-Dec | C256 (.01-.05) Percent | GRAPHIC OPERATIONS | C340 (.01) Interpret Graphs | GEOMETRY | C400 (.06) Definitions | B404 (.04) Definitions | C412 (.01-.03) Circles | MEASUREMENT | C500 (.01-.02-.04-.05-.06) Perimeter, Area, Volume | C504 (.01-.03-.06) convert measure | C508 (.01-.03) Operations of measure | C510 (.01-.04) Length, Area, Volume | PROBLEM SOLVING | C700 (.01-.02-.04-.06-.07-.13-.14) Mech. | C704 (.03) Consumer | C712 (.02-.05-.08) Science | | |

PARTICIPANTS AT AREA WORKSHOPS ON:

The Academic-Vocational Connection:
Equivalent Credit Options for Washington High Schools
January 14, 1986

NAME	SCHOOL DISTRICT
Cahill, Mary Ann	Lake Washington
Cairns, Jim	Lake Washington
Daigler, Dennis	Snoqualmie Valley
Davidson, Bob	Lake Washington
Ewer, Leslie	Issaquah
Haugen, Darlene	Issaquah
Lawrence, Carol	Snoqualmie Valley
Louviere, Ron	Issaquah
Marchall, Cindy	Snoqualmie Valley
McLeod, Jack	Bellevue
Menard, Scott	Snoqualmie Valley
Reeder, Jan	Bellevue
Shiveley, Jerry	Edmonds
Short, Tom	Lake Washington
Stout, Jan	Bellevue
Sutherland, Jan	Bellevue
Wing, Roger	Bellevue
Winston, Walt	Issaquah
Zimmerman, Bob	Issaquah

PARTICIPANTS AT AREA WORKSHOPS ON:

The Academic-Vocational Connection:
Equivalent Credit Options for Washington High Schools
February 13, 1986

NAME	SCHOOL DISTRICT
Alexander, Bob	Eisenhower/ Yakima
Birdsell, Dan	Deer Park
Bolz, Dennis	Wenatchee
Bongers, Ken	Eisenhower/Yakima
Boon, Rich	Eastmont
Chapton, Jerry	Eastmont
Crandall, Katherine	West Valley/Yakima
Dale, Larry	Richland
De Jong, Faye	Wenatchee
Dodge, Sonja	Yakima
Eastham, Jim	Richland
Fitch, Lanny	Wenatchee
Fulton, Rick	West Valley/Yakima
Getchell, Roger	Deer Park
Hanson, Stu	Eisenhower/Yakima
Hawkins, Bruce	Tri Cities Area
Hurraker, Jan	Eastmont
Jones, Danny	West Valley/Yakima
Lantis, Gary	West Valley/Yakima
McGill, John	Grandview
McLaughlin, Bob	Yakima
Miller, Joan	Grandview
Mills, Mike	Richland
Monahan, Paula	Yakima
Moses, Greg	Eastmont
Nash, John G.	Richland
Parton, Norma	Grandview
Peters, Cindy	Richland
Petry, Larry	Yakima
Rasmussen, Steve	Eastmont
Richards, Harold	Richland
Rozelle, Mike	Deer Park
Ruddell, George	Eastmont
Scholl, Becky	Yakima
Schroeder, Bob	Deer Park
Solowan, Ruth	Yakima
Vandenberg, Al	Richland
Vining, Ray	Grandview
Watrous, Dave	Richland
Zielich, Ron	Wenatchee

PARTICIPANTS AT AREA WORKSHOPS ON:

The Academic-Vocational Connection:
Equivalent Credit Options for Washington High Schools
April 8, 1986

NAME	SCHOOL DISTRICT
Acker, Ben	Ridgefield
Beard, Marjorie	Ocean Beach
Borg, George	Wahkiakum
Buesing, Kay	Ocean Beach
Carman, Tim	Battle Ground
Collins, Don	Vancouver
Cyr, Don	Battle Ground
Dudley, Tom	Battle Ground
Dufer, Jeffe H.	Battle Ground
Esche, Tim	Longview
Flatt, Elizabeth	Castle Rock
Foley, C. Dale	Battle Ground
Goin, Dennis	Battle Ground
Heritage, Allan	Ridgefield
Hermanson, Bev	Commission for Voc. Ed. Olympia
Holmes, John	Ocean Beach
Horlacher, Greta	Longview
Jackson, Phil	Battle Ground
McAlister, Jeff	Castle Rock
McConnell, Jim	Camas
McIntosh, Jay	Castle Rock
Mukensnabl, Judith	La Center
Perletti, Blayne	Ridgefield
Peterson, Donald L	Vancouver
Potter, Kay	Battle Ground
Quigley, Tom	Castle Rock
Radich, Paula	Kelso
Risinger, Bob	Battle Ground
Russell, Bruce	Vancouver
Sandison, Marilyn	Vancouver
Saunders, Michael	ESD 112
Wasly, Pat	ESD 112

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